Management of a Deep Infection Following Total Ankle Replacement

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Introduction

Total ankle replacement (TAR) is an acceptable alternative to ankle fusion for definitive treatment of painful end-stage degenerative ankle joint arthritis.

As more total ankle replacements are performed, we have a better understand of how to deal with the complications. In the case of a periprosthetic joint infection, swift decisions must be made regarding treatment course and ability to retain the implant to allow patient's to have the most successful outcome possible in terms of limb functionality.

Figure 1. Preoperative AP (A) and Lateral (B) radiographs of the patient's left ankle showing severe arthritis.

Statement of Purpose

Deep infections following total ankle replacement (TAR) present a challenging problem and decisions regarding implant retention depend on the timing and severity of infection following initial implant placement. This case study details our management of a patient who presented with a deep periprosthetic infection following TAR approximately 4 weeks postoperatively.

Literature Review

Infection rates following TAR have been reported to be 2.3-8.6%,[1-9] and are more common than infections following total hip and knee replacements.[1-3,7,8] It has been suggested that this is due in part to limited soft tissue coverage overlying the prosthesis and an incision in the anterior watershed area.[1] Risks for periprosthetic ankle joint infections include a history of surgery at the site, a low preoperative AOFAS hindfoot score, a long operative time, delayed healing of the incision with associated drainage, and an immunocompromised patient.[1-4,6,10]

Deep periprosthetic infections have been classified as early postoperative, remote hematogenous, or late chronic infections.[1,4-6,8]The time frame of these infection periods differs throughout the literature, but acute infections are generally defined as occurring within 3-8 weeks postoperatively with duration of symptoms less than 30 days.[1,3,5] Several authors suggest that early postoperative and acute hematogenous infections may be treated with culture-specific antibiotic therapy, incision and drainage, and polyethylene liner exchange with retention of the implant components. In cases of late chronic infections, it is suggested to treat the patient with culture-specific antibiotics and perform an incision and drainage with explant of components and place an antibiotic-impregnated cement spacer within the bony defect.[1-6,8] Options following this course of treatment include continued retention of cement spacer, revision TAR, ankle arthrodesis, or below knee amputation. Although these guidelines are well accepted based on the abovementioned classification, there remains a high incidence of persistent or recurrent infections requiring TAR explant following initial treatment. Myerson *et al.* stated that a limited number of patients who develop an infection following TAR can expect to have a successful course of treatment resulting in revision TAR.[1] Even with proper and timely management of infection, patient's must understand the likelihood of eventual implant failure.

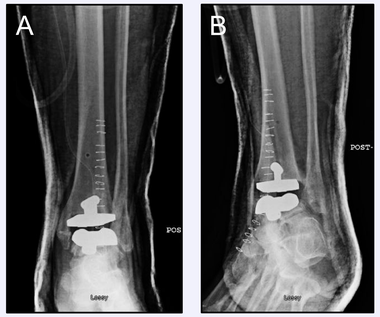

Figure 2. Postoperative AP (A) and Lateral Oblique (B) radiographs with two-component, fixed-bearing ankle prosthesis.

Procedures

A case is presented of a 55 year-old female with posttraumatic arthritis of the left ankle. She underwent open reduction and internal fixation of the left ankle at the age of 16 following a skateboarding accident, with subsequent hardware removal at the age of 20. After failing conservative measures she elected to undergo a total ankle replacement for definitive treatment. A two-component, fixed-bearing prosthesis was implanted without complication at the time of procedure (Figure 2). A hemovac drain was placed which was removed on the first postoperative day. She had an uneventful postoperative course for 4 weeks at which time she experienced partial dehiscence of the incision. A soft tissue infection was suspected and she was placed on an oral antibiotic. At 8 weeks postoperatively a peroneus brevis muscle flap was planned for closure, but intraoperatively purulence tracking into the joint capsule was encountered unexpectedly. The decision was made to remove the implant and an antibiotic spacer was placed within the bony defect with application of external fixation (Figure 3). An additional incision and drainage was performed several days later with closure of the wound. The external fixator was removed at 3 weeks postoperatively and the patient was placed on long term IV antibiotics managed by Infectious Disease. After discontinuation of antibiotics she did not experience any additional signs or symptoms of infection and her inflammatory markers remained low. The decision was made that it was safe to perform a revision arthroplasty. This was performed with a fixed-bearing, two-component modular prosthesis approximately 1 year after the index procedure (Figure 4). An extensor digitorum brevis (EDB) flap was used to aid in closure of the distal aspect of the incision as this had failed to fully heal with wound care. Since the revision procedure she has not experienced recurrence of infection.

Figure 3. Postoperative AP (A) and Lateral (B) radiographs with antibiotic-impregnated cement spacer after removal of external fixator.

Results

The patient underwent TAR with subsequent surgical debridement and explant with antibiotic spacer placement followed by TAR re-implantation and placement of an EDB flap for wound closure. The patient maintained ankle joint range of motion (Figure 5) with full closure of the anterior incision and is able to ambulate comfortably in regular shoe gear.

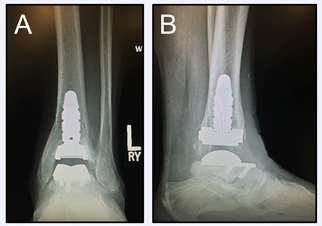

Figure 4. Postoperative AP (A) and Lateral (B) radiographs with revision TAR.

Discussion

This case study illustrates that a total ankle prosthesis can be salvaged following deep infection. However, it should be understood that this will involve a long course of complex treatment that may or may not results in prosthetic salvage. This patient ultimately experienced a successful outcome despite TAR explant with reimplantation.

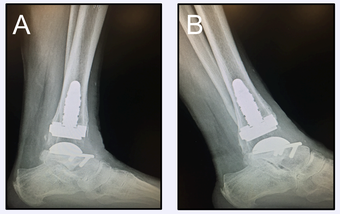

Figure 5. Dorsiflexion (A) and plantarflexion (B) ankle joint range of motion after revision TAR.

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